

The Royal Academy of Belgium.

By Professor CHARLES SAROLEA, LL.D., Foreign Member of the Royal Belgian Academy.

IN connection with the celebration this week of the one hundred and fiftieth anniversary of the Royal Academy of Belgium a volume has been prepared recording the varied activities of the Academy since its foundation in 1772.¹ Each section of the volume has been allotted to a specialist. M. Paul Pelseneer, the Permanent Secretary, contributes a luminous general introduction and a history of the Prize Foundations of the Institution. M. Stroobant contributes the mathematical and physical section; Prof. Massart writes on the biological sciences and M. Fourmarier on the mineral sciences. The historical sciences have been undertaken by Prof. Pirenne, the philological sciences by Prof. Thomas, the juridical sciences by M. Cornil, the philosophical sciences by Prof. Leclère, the economic sciences by Prof. Mahaim. M. Lucien Solvay and M. Paul Bergmans deal with painting, sculpture, engraving, and architecture.

The celebration of the one hundred and fiftieth anniversary of the Academy is deservedly an event of national import. The Royal Academy of Belgium has been closely identified with the intellectual and artistic life of the Belgian people, much more closely perhaps than any similar body on the Continent, because in Belgium the Academy has been the only important public institution discharging the function of intellectual leadership.

The commemoration will be all the more enthusiastically celebrated because during the war the Royal Academy, although its corporate life was interrupted for four years, incarnated the patriotic conscience of the Belgian people. During the war the German invaders took possession of the imposing palace which the Academy has occupied since 1874, polluted its premises, stole its books and archives, and imprisoned or deported several of its most illustrious members. The reply of the Belgian Academicians was to raise again and again indignant and courageous protests against the brutal policy of the enemy; and their fitting revenge was the recent publication by the Academy of a collection of photographs illustrating the shocking acts of vandalism perpetrated by the apostles of German Kultur.

When the Belgian Academy was founded in 1772 under the reign of Maria Theresa, literary and scientific life was virtually extinct in the Belgian provinces. Historians have often emphasised the contrast between the intensity of artistic life in Belgium and the sterility of literature and science. In the sixteenth century, Belgium still produced men of science of world-wide fame such as Mercator, Ortelius, Simon Stevin, von Helmont, Vesalius, just as Belgian literature in the fourteenth and fifteenth centuries produced a Froissart and a Commynes. But from the end of the sixteenth century for two hundred years Belgian literature and Belgian science are almost barren, at the very time when Belgian painting enters its golden age. The explanation of this contrast between the prosperity of art and the paralysis of literature and science is obvious. Art may flourish under conditions of political servitude. On the contrary literature and science demand political

freedom. Unfortunately from the end of the sixteenth century the Belgian provinces, unlike the Dutch, were reduced to a state of political slavery.

The foundation of the Belgian Academy in 1772 coincides with the political awakening of the Belgian people. After two centuries the Belgians prepare to shake off the foreign yoke. They are only linked with Austria by a loose political connexion. Unfortunately the Academy is scarcely launched when the French Revolution and the Civil War which follows suspend its activities. Nor can the new Institution be restored under Napoleon. The Emperor had had too many unpleasant relations with the French Academy and with the ideologists of the French Institute to feel disposed to encourage abroad independent scientific or literary institutions. Moreover, apart from his suspicion of Academies in general, he looked upon Belgium as a conquered province and as a mere department of the French Empire.

The Academy was restored in 1816 after Waterloo, by the Dutch Government; and it is interesting to note to-day, at a time when the conflict about the use of the Flemish and the French languages has become acute in Belgium, that even under Dutch supremacy French did remain the sole official language of the Academy of Brussels. But it was not merely the French language which retained its supremacy; the very organisation of the Academy tended to follow French models rather than German or English. When the constitution of the Academy was finally adjusted in 1845, its organisation came to resemble very closely that of the French Institute. It contained the three classes, physical and mathematical science, fine art, and letters. This third class was itself eventually subdivided into the two sections, the historical and philological sciences, and the moral and political sciences. The three classes and four sections of the Belgian Academy therefore answer exactly four of the sections of the French Institute. The chief difference between the two institutions is that there is nothing in the Belgian Academy corresponding to the fifth and most famous section of the French Institute, namely the French Academy. The French Academy mainly represents pure literature, whereas literature pure and simple is excluded from the Belgian Academy. To do justice to the claims of literature, the Flemish Men of Letters constituted themselves in 1888 into a separate Flemish Academy. In 1921, the Franco-Belgian writers followed their colleagues by establishing an Academy of French Literature.

There is one essential feature in which the Belgian Academy resembles the French Institute rather than the Royal Societies of London and Edinburgh; we refer to the strict limitation of its membership. A sure instinct convinced the founders and organisers of the Academy that its influence must needs be in inverse ratio to its numbers. The membership of each class has therefore been restricted to thirty Belgian members with an equal number of foreign associates. It is probable that if the numbers of the Belgian Royal Academy had been increased to some seven or eight hundred as in the case of the Royal Society of Edinburgh,

¹ L'Académie Royale de Belgique depuis sa fondation (1772-1922). Pp. 343. (Bruxelles: M. Lamertin; M. Hayez, 1922).

its authority and prestige would have been very different. It is a high honour to be selected one of a small élite. It is a doubtful compliment to be included in a miscellaneous crowd, and one may not feel very proud to add the letters F.R.S.E. after one's name.

It is not too much to say that the history of the Royal Academy of Brussels for the last hundred years is the history of Belgian science and Belgian learning. Nothing is more remarkable in its activities than the universality of their range. The Academy may claim among its members men of world-wide reputation in every branch of activity. It has produced mathematicians and physicists like Quetelet and Stas; naturalists and chemists like van Beneden and Spring; jurists like Willems and Thonissen; historians like Gachard, Kurth, Cumont, and Pirenne. Looking at the record of those eminent men, Belgium is entitled to a high place amongst the smaller powers of Europe. In one important respect the Royal Academy of Belgium has set an example even to larger and more ancient institutions. It has encouraged research and learning not only by the number and value of its publications. The publications of the Academy constitute indeed a considerable library and are perhaps only rivalled by the editions of that illustrious national seat of learning, the Academy of Cracow. It has published over two hundred volumes of Memoirs, one hundred volumes of bulletins, a collection of about one

hundred volumes of the national writers of Belgium, including the Chronicles of Froissart and Commines and Jehan le Bel. In addition it has published a Dictionary of National Biography of which twenty-two volumes have already appeared, and last but not least, it has issued one hundred and thirty volumes of Belgian Chronicles.

The literary activity of the Academy has been all the more useful because Belgian writers, owing to the exiguity of the national territory, can appeal only to a small audience and are generally depending on the support of the French reading public. That activity has been all the more creditable because hitherto the Belgian Academy has had no legal status and for that reason it cannot administer directly any funds or property which may be left to it.

There are good reasons to hope that in the near future the Belgian Academy will at last be endowed with its civil and legal personality. Under that new regime, under the patronage of an enlightened sovereign, and with a national conscience which has been quickened by the tragedy of the war, the Royal Belgian Academy may look forward to an enlarged sphere of scientific and literary usefulness. The present historical record of the institution may therefore be accepted not only as a fitting tribute to the past, but as the promise of an even more brilliant future.

The Cause and Character of Earthquakes.¹

By R. D. OLDHAM, F.R.S.

THE stress-difference required to produce fracture in average hard rocks, as they are met with at the surface, is round about 1,000,000 grammes per centimetre square, and, allowing for the greater strength at depth, which is indicated by the experiments of Prof. Adams and the computations of Prof. Barrell, we may put the breaking strength of the earth's crust at about double this quantity, so that to reach this point in one year from starting, the strain would have to increase at the rate of about 1400 grammes per centimetre square in each quarter of a day. According to the late Sir George Darwin the stress-differences set up by the moon in the latitude of Italy would amount to about 20 grammes per centimetre square in an incompressible Earth, and in a compressible Earth with an incompressible crust, a condition much more akin to what we have reason to suppose is the reality, the stress-differences would be many times this figure; but even the lower amount is nearly $1\frac{1}{2}$ per cent. of the growth required to reach breaking point in one year; it would be close on 15 per cent. if the period is increased to ten years, and, with anything approaching this proportion, a periodicity would result which could not have escaped detection before now.

The figures, therefore, give us a lower limit of the rate of growth of strain; it must have been something faster than that needed to reach the breaking point in one year from starting, if the differences on which the argument is based are real. But are they real? The actual amount of difference, barely one per cent. of the mean, is so small that it may well be fortuitous, and the true interpretation may be that the gravita-

tional stresses, and the stress-differences produced by them, have no effect whatever in determining the time of occurrence of an earthquake. If this be so, then the rate of growth of strain becomes infinite, and each earthquake becomes the result of a development of strain, akin to an explosion in its suddenness.

The truth may lie anywhere and must lie somewhere between these extremes, so we reach the conclusion that there is no support for the commonly accepted notion of a continuous, slow growth of strain, extending over years, decades, or even centuries, before the breaking point is reached; on the contrary, it appears that the cause of earthquakes must be a rapid growth of strain. This strain cannot be developed without some deformation, but the magnitude of this has no relation to the frequency or magnitude of the earthquakes; if change of form is slow and prolonged, relief may be provided by gradual yielding, if rapid, a very small amount of distortion may lead to fracture, and on the extent, form, and position of this fracture will depend the character of the resulting earthquake.

This study of the rate of growth leads to the question, which is the really important one in its bearing on geology, of how the strain is produced. It can scarcely be the result of those tectonic processes which result in folding, for these must necessarily be slow in their action; the change of form involved in the bending of solid rock from its original shape into complicated folds, without breach of continuity, can only have been a slow one, and, as we have seen, the deformation which produces earthquakes must be a rapid one. With faults the case is different; many

¹ Continued from p. 653.